



**The frequency and source of eyeglass insurance coverage in Ontario: A repeated population-based cross-sectional study**

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Complete List of Authors:	<p>Nichani, Prem; University of Toronto Faculty of Medicine, Department of Ophthalmology &amp; Vision Sciences; University of Toronto Institute of Health Policy Management and Evaluation</p> <p>Trope, Graham; University of Toronto Faculty of Medicine, Department of Ophthalmology &amp; Vision Sciences; Toronto Western Hospital, Department of Ophthalmology &amp; Vision Sciences</p> <p>Buys, Yvonne; University of Toronto Faculty of Medicine, Department of Ophthalmology &amp; Vision Sciences; Toronto Western Hospital, Department of Ophthalmology &amp; Vision Sciences</p> <p>Markowitz, Samuel; University of Toronto Faculty of Medicine, Department of Ophthalmology &amp; Vision Sciences; Toronto Western Hospital, Department of Ophthalmology &amp; Vision Sciences</p> <p>El-Defrawy, Sherif; University of Toronto Faculty of Medicine, Department of Ophthalmology &amp; Vision Sciences; Kensington Eye Institute</p> <p>Ngo, Gordon; University of Western Ontario Schulich School of Medicine and Dentistry, Department of Physical Medicine and Rehabilitation</p> <p>Markowitz, Michelle</p> <p>Jin, Yaping; University of Toronto Faculty of Medicine, Department of Ophthalmology and Vision Sciences; University of Toronto Dalla Lana School of Public Health, Department of Public Health Sciences</p>
Keywords:	Epidemiology, Health policy, Ophthalmology, Public health
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Abstract:	<p>Background: Inability to afford eyeglasses leaves refractive errors inadequately corrected, which accounts for two-thirds of visual impairment in Canada. We determined the frequency and source of eyeglass insurance to understand how Canadians finance optical correction.</p> <p>Methods: Insurance data from Ontario respondents to the Canadian Community Health Survey in 2003 (n=42,777), 2005 (n=41,766), and 2013/14 (n=42,553) was analyzed by socio-demographics. Proportions and prevalence ratios (PR) of having insurance were computed and compared.</p>

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	<p>Results: Insurance covered all or part of eyeglass costs for 62% of Ontarians in all survey years. Among those covered, 84-86% were sponsored by employers, 9-10% by the government, and 6-7% via private plans. In 2005 and 2013/14, employer-sponsored coverage remained at 87% for individuals in households with post-secondary graduation, but decreased significantly for those in households without secondary school graduation, from 67.0% (95% confidence interval [CI] 63.2-70.8%, 175,000 individuals) in 2005 to 54.6% (95% CI 50.1-59.2%, 123,500 individuals) in 2013/14. Government-sponsored coverage increased significantly for individuals in households without secondary school graduation, from 29.2% (95% CI 26-33%, 76,400 individuals) in 2005 to 41.7% (95% CI 37-46%, 93,900 individuals) in 2013/14. Ontarians in households without secondary school graduation (versus those with) were less likely to report employer-sponsored coverage (adjusted PR 0.79, 95% CI 0.75-0.84), but more likely to have government-sponsored coverage (adjusted PR 1.27, 95% CI 1.06-1.53).</p> <p>Interpretation: 62% of Ontarians had eyeglass insurance. The largest source of insurance was employer-sponsored, primarily covering those with higher levels of education. In recent years, government-sponsored insurance increased significantly amongst low-educated individuals.</p>



1 Research Paper

2  
3 **The frequency and source of eyeglass insurance coverage in Ontario: A repeated**  
4 **population-based cross-sectional study**

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6 Prem Nichani MSc MD(C),<sup>1,2</sup> Graham E. Trope MB PhD,<sup>3,4</sup> Yvonne M. Buys MD,<sup>3,4</sup> Samuel N.  
7 Markowitz MD,<sup>3,4</sup> Sherif El-Defrawy MD PhD,<sup>3,5</sup> Gordon Ngo MD,<sup>6</sup> Michelle Markowitz OD,<sup>7</sup>  
8 Ya-Ping Jin MD PhD<sup>3,8</sup>

9  
10 <sup>1</sup>Faculty of Medicine, University of Toronto

11 <sup>2</sup>Institute of Health Policy, Evaluation and Management, University of Toronto

12 <sup>3</sup>Department of Ophthalmology & Vision Sciences, University of Toronto

13 <sup>4</sup>Toronto Western Hospital, University Health Network

14 <sup>5</sup>Kensington Eye Institute

15 <sup>6</sup>Faculty of Medicine, University of Western Ontario

16 <sup>7</sup>Private Practice

17 <sup>8</sup>Dalla Lana School of Public Health, University of Toronto

18  
19  
20 **Correspondence:**

Ya-Ping Jin MD PhD

Department of Ophthalmology and Vision Sciences

University of Toronto

340 College Street, Suite 400

Toronto, Ontario, Canada

M5T 1S8

Telephone: 416-978-7938

Email: [yaping.jin@utoronto.ca](mailto:yaping.jin@utoronto.ca)

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3 **55 Abstract**  
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5 **56 Background:** Inability to afford eyeglasses leaves refractive errors inadequately corrected,  
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8 **57** which accounts for two-thirds of visual impairment in Canada. We determined the frequency and  
9  
10 **58** source of eyeglass insurance to understand how Canadians finance optical correction.

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12 **59 Methods:** Insurance data from Ontario respondents to the Canadian Community Health Survey  
13  
14 **60** in 2003 (n=42,777), 2005 (n=41,766), and 2013/14 (n=42,553) was analyzed by socio-  
15  
16  
17 **61** demographics. Proportions and prevalence ratios (PR) of having insurance were computed and  
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19 **62** compared.  
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21  
22 **63 Results:** Insurance covered all or part of eyeglass costs for 62% of Ontarians in all survey years.  
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24 **64** Among those covered, 84-86% were sponsored by employers, 9-10% by the government, and 6-  
25  
26 **65** 7% via private plans.  
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29 **66** In 2005 and 2013/14, employer-sponsored coverage remained at 87% for individuals in  
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31 **67** households with post-secondary graduation, but decreased significantly for those in households  
32  
33 **68** without secondary school graduation, from 67.0% (95% confidence interval [CI] 63.2-70.8%,  
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35 **69** 175,000 individuals) in 2005 to 54.6% (95% CI 50.1-59.2%, 123,500 individuals) in 2013/14.  
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38 **70** Government-sponsored coverage increased significantly for individuals in households without  
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40 **71** secondary school graduation, from 29.2% (95% CI 26-33%, 76,400 individuals) in 2005 to  
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42 **72** 41.7% (95% CI 37-46%, 93,900 individuals) in 2013/14.  
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44  
45 **73** Ontarians in households without secondary school graduation (versus those with) were less likely  
46  
47 **74** to report employer-sponsored coverage (adjusted PR 0.79, 95% CI 0.75-0.84), but more likely to  
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49 **75** have government-sponsored coverage (adjusted PR 1.27, 95% CI 1.06-1.53).  
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76 **Interpretation:** 62% of Ontarians had eyeglass insurance. The largest source of insurance was  
77 employer-sponsored, primarily covering those with higher levels of education. In recent years,  
78 government-sponsored insurance increased significantly amongst low-educated individuals.

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3 79 An estimated 57% of Canadians aged 20+, i.e., 16.8 million individuals in 2019,<sup>1</sup> have  
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5 80 some form of vision problem requiring optical correction.<sup>2</sup> This percentage increases to 80%  
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7 81 among Canadians aged 50+.<sup>2</sup> In the US, clinically-important refractive errors similarly affect  
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9 82 over half of Americans.<sup>3</sup> An appropriate pair of eyeglasses is a simple means to correct vision  
10  
11 83 problems caused by refractive errors. However, the affordability of eyeglasses is a significant  
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13 84 public health concern. In Canada, the cost of a pair of prescription eyeglasses may be prohibitive,  
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15 85 ranging from \$240 to \$1000 in retail stores.<sup>4</sup> Uncorrected and undercorrected refractive error  
16  
17 86 may result in significant visual impairment, and the magnitude of this impairment is surprising.<sup>5-</sup>  
18  
19 87 <sup>7</sup> Robinson et al. reported that 71.8% of visual impairment amongst Ontarians aged 40+ are  
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21 88 amenable to refractive correction.<sup>8</sup> In 2018, Aljied et al. revealed that between 64% and 80% of  
22  
23 89 visual impairment amongst Canadians aged 45+ are due to refractive errors.<sup>9</sup> Similar findings  
24  
25 90 have been reported from the US and Australia.<sup>10-12</sup>

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27 91 In Canada, the cost of eyeglasses is not covered by any provincial health insurance plans.  
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29 92 The vast majority of Canadians have to pay out-of-pocket or make use of an insurance plan to  
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31 93 obtain optical correction. Based on data collected in 2003, we reported that approximately 55.0%  
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33 94 of Canadians nationwide had insurance that covered all or part of the cost for eyeglasses.<sup>13</sup>  
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35 95 However, the source from which Canadians obtain their eyeglass insurance and changes in  
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37 96 coverage in recent years is unknown. In this study, we determined the frequency and source of  
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39 97 eyeglass insurance coverage in Ontario and the time trend from 2003 to 2013/14 to better  
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41 98 comprehend how individuals finance prescription eyewear. Ultimately, we hope that this study  
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43 99 may shed light on public policy solutions to eradicate avoidable visual impairment and  
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45 100 associated medical and social consequences such as falls, injuries, and accidents.<sup>14-17</sup>

## 101 **Methods**

## 102 **Setting and Study Design**

103 The study setting was in Ontario, Canada where the cost for eyeglasses is not covered by  
104 the government unless one is registered with a social assistance program (e.g., the Ontario Works  
105 and the Ontario Disability Support Program)<sup>18,19</sup> or belongs to a specific population (e.g.,  
106 veterans, refugees, First Nations, and Inuit).<sup>20-23</sup> A population-based, cross-sectional survey in  
107 2003, 2005, and 2013/14 was used to achieve our study purposes.

## 108 **Data Source and Participants**

109 The Canadian Community Health Survey (CCHS) is a nationwide, cross-sectional, self-  
110 report survey covering 98% of Canadians aged 12+ living in private dwellings.<sup>24</sup> Survey  
111 participants were randomly-selected by Statistics Canada with a response rate of 92.6% in 2003,  
112 92.9% in 2005, and 87.3% in 2013/14 nationwide.<sup>24-26</sup> The present study is an analysis of  
113 Ontario respondents from the CCHS in 2003 (n=42,777), 2005 (n=41,766), and 2013/14  
114 (n=42,553). This is because Ontario was the only province to participate in the optional module  
115 on eyeglass insurance in the three survey years. The Ontario response rate was 91.4% in 2003,  
116 92.2% in 2005, and 86.4% in 2013/14.<sup>24-26</sup>

## 117 **Outcome Measures**

118 Our study outcome measures were the frequency and source of eyeglass insurance  
119 coverage in proportions. This information was ascertained from the survey questions: “Now,  
120 turning to your insurance coverage. Please include any private, government or employer-paid  
121 plans.” Following this opening statement, participants were asked, “Do you have insurance that  
122 covers all or part of the costs of eyeglasses or contact lenses?”<sup>27-29</sup> Those who responded “Yes”  
123 in the CCHS 2005 and 2013/14 surveys were further asked: “Is it  
124 (1) a government-sponsored plan?”

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3 125 (2) an employer-sponsored plan? and/or

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5 126 (3) a private plan?"<sup>27,28</sup>

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7 127 One (0.002%) respondent in 2005 and five (0.01%) in 2013/14 reported having coverage

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9 128 from all three sources. These rare cases were included in analyses on source of insurance. No

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11 129 question on source of insurance was asked in the CCHS 2003 survey. Between 3-5% of

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13 130 respondents in each of the surveys did not have a valid answer to the question on eyeglass

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15 131 insurance. These participants were excluded from the analysis.

### 16 17 132 **Other Measures**

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19 133 Participants were asked to respond to questions revealing their age, sex, ethno-racial

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21 134 background, immigration status, and marital status. Information on the highest level of education

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23 135 acquired in the household was obtained through a series of questions and was categorized by

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25 136 Statistics Canada into four groups: "Less than secondary school graduation," "Secondary school

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27 137 graduation, no post-secondary," "Some post-secondary education," and "Post-secondary

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29 138 certificate/diploma or university degree."<sup>28,30</sup> Similarly, data on the total household income was

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31 139 collected through a series of questions by Statistics Canada which we further consolidated into

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33 140 three approximately equal groups: under middle level (total household income <\$40,000),

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35 141 middle level (total household income between \$40,000-79,999 in 2003 and 2005, and \$40,000-

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37 142 89,999 in 2013/14), and above middle level (total household income \$80,000+ in 2003 and 2005,

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39 143 and \$90,000+ in 2013/14).<sup>27-29</sup>

### 40 41 144 **Statistical Analysis**

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43 145 We determined the frequency and source of eyeglass insurance coverage in percentages.

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45 146 The frequency of coverage was calculated as the proportion of respondents who self-reported

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47 147 having insurance amongst all respondents. The percentage of source of insurance was computed

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3 148 as the proportion of respondents who self-reported having employer-sponsored (or government-  
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5 149 sponsored, or private plan) coverage amongst all respondents who self-reported having eyeglass  
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7 150 insurance. Factors associated with having insurance coverage were examined with prevalence  
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9 151 ratios (PR) derived from the log-Poisson regression model with robust variance estimation.<sup>31,32</sup>  
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11 152 The odds ratio from the logistic regression model was not used because the occurrence of the  
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13 153 studied outcomes was quite common (>34%). Survey weights provided by Statistics Canada  
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15 154 were used in all analyses to account for sample selection, a complex survey, and adjustments for  
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17 155 seasonal effect, post-stratification, non-response, and calibration.<sup>24-26</sup> Weighted data are more  
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19 156 representative of the survey population and are required by Statistics Canada for reporting when  
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21 157 producing population estimates.<sup>24-26</sup> The 95% confidence intervals (CI) were constructed using  
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23 158 bootstrap weights provided by Statistics Canada.

### 159 **Ethics Approval**

160 Informed consent was obtained by Statistics Canada from all study participants. The  
161 analysis of Statistics Canada data for this study was approved by the University of Toronto  
162 Research Ethics Board.

### 163 **Results**

164 Overall, 62% of Ontarians were covered in part or in full for the costs of eyeglasses or  
165 contact lenses in 2003, 2005, and 2013/14 (Table 1), leaving 4.2 million Ontarians aged 12+  
166 without any source of insurance in 2013/14. Insurance coverage was higher amongst the 40-64  
167 and 12-19 age groups and lower in those aged 65-74 and 75+ (Table 1). In 2013/14, coverage in  
168 the 75+ group (34.9%) was nearly half of the coverage in the 40-64 group (70.7%).

169 The coverage increased in parallel with level of education and income (Table 1). By  
170 marital status, insurance coverage in widows was lowest (36.1% in 2013/14) and was nearly half

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3 171 of the coverage amongst those who were married or in a common-law relationship (67.2% in  
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5 172 2013/14). Aboriginals had the highest coverage (71.7% in 2013/14), followed by individuals  
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7 173 who self-identified as whites (64.4% in 2013/14). Compared to immigrants, non-immigrants had  
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9 174 significantly higher coverage even when compared to those who had lived in Canada for over 10  
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11 175 years (Table 1).

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14 176 Amongst Ontarians with eyeglass coverage, the source of funding was via employers in  
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16 177 84.1-86.0%, government-subsidies in 9.0-10.3%, and private plans in 5.7-6.8% (Figure 1).

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19 178 In 2005 and 2013/14, employer-sponsored coverage remained at 87.0% for those in  
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21 179 households with post-secondary school graduation (Figure 2A). Amongst individuals in  
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23 180 households without secondary school graduation, employer-sponsored coverage decreased  
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25 181 significantly from 67.0% (95% CI 63.2-70.8%, 175,000 individuals) in 2005 to 54.6% (95% CI  
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27 182 50.1-59.2%, 123,500 individuals) in 2013/14 (Figure 2A). For individuals in households with  
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29 183 under middle level income, employer-sponsored coverage decreased significantly from 63.5%  
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31 184 (95% CI 61.2-65.8%) in 2005 to 53.1% (95% CI 50.1-56.0%) in 2013/14 (Figure 2B).

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33 185 In contrast, government-sponsored coverage increased significantly amongst individuals  
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35 186 in households without secondary school graduation, from 29.2% (95% CI 25.5-32.9%, 76,400  
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37 187 individuals) in 2005 to 41.7% (95% CI 37.2-46.1%, 93,900 individuals) in 2013/14 (Figure 3A).  
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39 188 Government-sponsored coverage also increased significantly in those with household income  
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41 189 under middle level (Figure 3B).

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43 190 Adjusting for the confounding effects of age, sex, household income, marital status,  
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45 191 immigrant status, and ethno-racial background, individuals in households without secondary  
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47 192 school graduation, versus those with, were significantly less likely to have employer-sponsored  
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5 194 insurance (adjusted PR 1.27, 95% CI 1.06-1.53) in 2013/14 (Table 2).  
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## 8 195 **Interpretation**

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10 196 We examined the frequency and source of eyeglass insurance coverage and the time trend  
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12 197 from 2003 to 2013/14 in Ontario using representative data collected by Statistics Canada. Our  
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14 198 results indicate that 62% of Ontarians aged 12+ had eyeglass insurance, varying little from 2003  
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16 199 to 2013/14. The largest source of insurance was employer-sponsored, followed by government  
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18 200 subsidies and private plans. Employer-sponsored insurance primarily covered individuals in  
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20 201 households with post-secondary school graduation. Employer-sponsored insurance decreased  
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22 202 significantly in 2013/14 versus 2005 for individuals in households without secondary school  
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24 203 graduation. In contrast, government coverage increased significantly in recent years amongst  
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26 204 individuals in households without secondary school graduation. In 2013/14, over four million  
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28 205 Ontarians had no insurance at all making them potentially vulnerable to cost barriers associated  
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30 206 with the purchase of eyeglasses.  
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35 207 Our finding of decreased employer-sponsored coverage is in agreement with the report of  
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37 208 Chan et al. These authors reported that employer-sponsored health insurance including eyeglass  
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39 209 coverage among retirees in Ontario has declined in recent years.<sup>33</sup> In the US, “vision insurance”  
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41 210 has been studied using data which includes coverage for routine eye examinations, prescription  
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43 211 lenses, and frames.<sup>34,35</sup> Using self-reported data from the US National Health Interview Survey,  
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45 212 Varadaraj et al. reported that 15-20% of Americans aged 18+ had vision insurance obtained  
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47 213 through employment, purchased directly, or via government programs like Medicaid in 2008-  
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49 214 2016.<sup>35</sup> This US coverage is much lower than the 62% coverage we report. However, differences  
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51 215 in survey questions asked (“Having a single service plan for vision care” in the US study versus  
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3 216 “Do you have insurance that covers all or part of the costs of eye glasses or contact lenses?” in  
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5 217 our study), age groups studied (18+ versus 12+, respectively), and US national versus Ontario  
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7 218 provincial coverage makes it difficult to comment on the large variations reported. Using the  
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9 219 Behavioral Risk Factor Surveillance System vision module data and restricting the study  
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11 220 population to those 40-64 years old, Li et al. reported that 59.4% of Americans in eight states had  
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13 221 vision insurance in 2008,<sup>34</sup> compared with 59.5% of working age Canadians nationwide in  
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15 222 2003<sup>13</sup> and 68.9% in Ontario in 2005 in this study. Accordingly, coverage amongst the working  
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17 223 age group seems to be similar in both Canada and the United States. We are not aware of prior  
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19 224 studies reporting on the source of eyeglass insurance. Our data suggests that the current eyeglass  
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21 225 funding model is primarily made up of employer-sponsored coverage, government subsidies, and  
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23 226 individual expenses. Those with post-secondary school graduation seem to be more likely to find  
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25 227 a job with employer-sponsored eyeglass benefits while those without secondary school  
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27 228 graduation are more likely to receive government subsidies. Regrettably, over four million  
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29 229 Ontarians are left without any insurance coverage. Globally, there were 1.41 billion people with  
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31 230 myopia needing vision correction<sup>36</sup> and 0.82 billion people with visual impairment from  
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33 231 correctable presbyopia.<sup>37</sup> Considering these large numbers, research endeavors on eyeglass  
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35 232 insurance coverage is lacking.<sup>13,34,35</sup>

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38 233 Many large corporations find the burden of providing health insurance for their workers  
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40 234 seriously affects their ability to compete globally.<sup>38</sup> Some smaller companies have eliminated  
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42 235 their health insurance entirely, or require greater contributions from the insured worker.<sup>38,39</sup>  
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44 236 Currently, financial deficits in healthcare budgets exist in almost every Canadian province;  
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46 237 expanding either employer- or government-sponsored eyeglass coverage therefore seems  
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48 238 unlikely to occur. However, maintaining the current funding model will mean that about 40% of  
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3 239 Ontarians will remain uninsured. This also means that two-thirds of those with visual  
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5 240 impairment<sup>8,9</sup> are unlikely to receive treatment and so we can expect no change in the associated  
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7 241 health consequences linked to visual impairment such as accidents and falls.<sup>14-17</sup> We therefore  
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9 242 call for politicians, policymakers, governments and researchers to develop innovative solutions  
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11 243 to help remedy the widespread need for optical correction.  
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#### 14 244 **Limitations**

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17 245 This study has several limitations including the use of self-reported data which can be  
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19 246 affected by recall and social desirability bias. Second, only Ontarians living in private houses  
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21 247 were studied; results are not generalizable to those living in long-term care facilities, of no fixed  
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23 248 address, or in other provinces.<sup>13</sup> Lastly, the survey question asked does not have information on  
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25 249 the amount of coverage or whether co-payments are required when using an insurance plan.  
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#### 28 250 **Conclusion**

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31 251 We examined the frequency and source of eyeglass insurance coverage in Ontario and the  
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33 252 time trend from 2003 to 2013/14. Results revealed that approximately 40% of Ontarians between  
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35 253 2003 and 2013/14 did not have insurance coverage and may be vulnerable to cost barriers  
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37 254 associated with obtaining eyeglasses. Amongst those insured, employers were the largest source  
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39 255 of insurance primarily covering individuals in households with post-secondary school graduation  
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41 256 while government subsidies were primarily provided to individuals in households without  
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43 257 secondary school graduation. In recent years, employer-sponsored coverage decreased by 12.4%  
44  
45 258 while government subsidies increased by 12.5% amongst people living in households without  
46  
47 259 secondary school graduation. More research is needed to eliminate refractive visual impairment  
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49 260 and associated consequences.  
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371 **Figure legends**

372 FIGURE 1. Eyeglass insurance coverage by source of funding amongst Ontarians in the 2005  
373 and 2013/14 Canadian Community Health Surveys. Data for 2003 was unavailable. Vertical lines  
374 represent the 95% confidence intervals.

375  
376 FIGURE 2. Percentage of Ontarians having employer-sponsored eyeglass insurance coverage by  
377 the highest level of education attained in the household (A) and total household income (B) in  
378 the 2005 and 2013/14 Canadian Community Health Surveys. Data for 2003 was unavailable.  
379 Vertical lines represent the 95% confidence intervals.

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381 FIGURE 3. Percentage of Ontarians having government-sponsored eyeglass insurance coverage  
382 by the highest level of education attained in the household (A) and total household income (B) in  
383 the 2005 and 2013/14 Canadian Community Health Surveys. Data for 2003 was unavailable.  
384 Vertical lines represent the 95% confidence intervals.

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**Table 1: Weighted prevalence of eyeglass insurance coverage stratified by sociodemographic characteristics (% , [95% confidence interval])**

Participant Characteristics	2003	2005	2013/2014
<b>Age</b>			
12-19	69.2 [67.3-71.1]	67.6 [65.7-69.6]	67.4 [65.2-69.6]
20-39	62.0 [60.6-63.4]	61.7 [60.4-63.0]	60.5 [58.8-62.1]
40-64	68.7 [67.6-69.9]	68.9 [67.7-70.1]	70.7 [69.2-72.1]
65-74	42.8 [40.8-44.9]	40.9 [38.9-42.9]	44.5 [42.5-46.5]
75+	34.2 [32.1-36.3]	36.2 [33.8-38.6]	34.9 [32.9-36.8]
Total	62.3 [61.5-63.0]	62.1 [61.3-62.8]	62.0 [61.1-62.9]
<b>Sex</b>			
Female	61.7 [60.7-62.8]	60.9 [59.8-61.9]	61.3 [60.0-62.5]
Male	62.8 [61.7-63.9]	63.3 [62.3-64.3]	62.8 [61.4-64.1]
<b>Highest Level of Education in Household</b>			
<secondary school graduation	43.2 [41.0-45.5]	42.5 [40.1-45.0]	37.4 [34.6-40.2]
Secondary school graduation	57.9 [56.0-59.8]	55.9 [53.8-57.9]	53.0 [50.5-55.4]
Some post-secondary school	60.5 [57.4-63.7]	58.9 [55.3-62.5]	57.6 [52.3-62.9]
Post-secondary school graduation	65.7 [64.8-66.6]	65.6 [64.7-66.5]	66.1 [65.1-67.1]
<b>Marital Status</b>			
Married/common-law	66.0 [65.1-66.9]	65.8 [64.8-66.8]	67.2 [66.1-68.3]
Widowed	36.3 [33.9-38.6]	36.3 [33.8-38.8]	36.1 [33.6-38.6]
Separated/divorced	56.9 [54.4-59.5]	57.0 [54.3-59.6]	54.5 [51.1-57.8]
Single/never married	60.2 [58.7-61.7]	59.8 [58.5-61.1]	57.9 [56.2-59.5]
<b>Household Income</b>			
Under middle level	41.6 [40.2-43.0]	38.7 [37.3-40.1]	38.2 [36.4-40.0]
Middle level	65.6 [64.4-66.9]	64.2 [64.2-62.8]	60.8 [59.3-62.2]
Above middle level	77.7 [76.5-78.9]	77.9 [76.8-79.0]	77.3 [76.1-78.5]
<b>Ethnic Background</b>			
White	64.7 [63.9-65.4]	64.4 [63.6-65.1]	64.4 [63.6-65.3]
Non-white	52.2 [50.0-54.4]	53.1 [50.9-55.3]	54.3 [52.0-56.6]
Aboriginal	72.4 [67.1-77.6]	67.6 [53.1-72.0]	71.7 [67.8-75.7]
<b>Immigrant Status</b>			
Non-immigrant	67.1 [66.3-67.8]	66.3 [65.6-67.1]	66.7 [65.8-67.6]
Immigrant			
≤9-years	41.7 [38.1-45.2]	45.4 [41.8-49.0]	43.6 [39.1-48.0]
≥10-years	54.8 [53.0-56.5]	55.3 [53.4-57.3]	55.0 [52.9-57.1]

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**Table 2: Adjusted prevalence ratio (PR) of having employer- and government-sponsored insurance in 2013/14  
([95% confidence interval])**

<b>Participant Characteristics</b>	<b>Employer-Sponsored</b>	<b>Government-Sponsored</b>
<b>Age</b>		
12-19 vs. 40-64	1.31 [1.13-1.52]	0.67 [0.63-0.72]
20-39 vs. 40-64	0.95 [0.91-0.99]	0.72 [0.66-0.77]
65-74 vs. 40-64	0.59 [0.57-0.61]	0.85 [0.68-1.05]
75+ vs. 40-64	0.47 [0.39-0.56]	1.02 [0.72-1.45]
<b>Sex</b>		
Male vs. Female	0.98 [0.93-1.03]	1.00 [0.97-1.04]
<b>Highest Level of Education in Household</b>		
<secondary school graduation vs. secondary school graduation	0.79 [0.75-0.84]	1.27 [1.06-1.53]
Some post-secondary school vs. secondary school graduation	1.05 [0.95-1.16]	1.23 [0.96-1.57]
Post-secondary school graduation vs. secondary school graduation	1.12 [1.08-1.16]	0.84 [0.67-1.05]
<b>Marital Status</b>		
Widowed vs. Married/common-law	0.88 [0.72-1.07]	0.82 [0.77-0.87]
Separated/divorced vs. Married/common-law	0.86 [0.76-0.97]	1.21 [1.10-1.32]
Single/never married vs. Married/common-law	0.70 [0.60-0.81]	1.60 [1.30-1.96]
<b>Household Income</b>		
Under middle level vs. above middle level	0.37 [0.35-0.40]	3.64 [3.37-3.93]
Middle level vs. above middle level	0.82 [0.78-0.85]	1.25 [1.06-1.47]
<b>Ethnic Background</b>		
Non-white vs. White	0.95 [0.87-1.04]	0.78 [0.58-1.06]
Aboriginal vs. White	0.91 [0.83-0.99]	3.26 [2.81-3.79]
<b>Immigrant Status</b>		
Immigrant vs. non-immigrant	0.87 [0.86-0.89]	0.69 [0.64-0.74]

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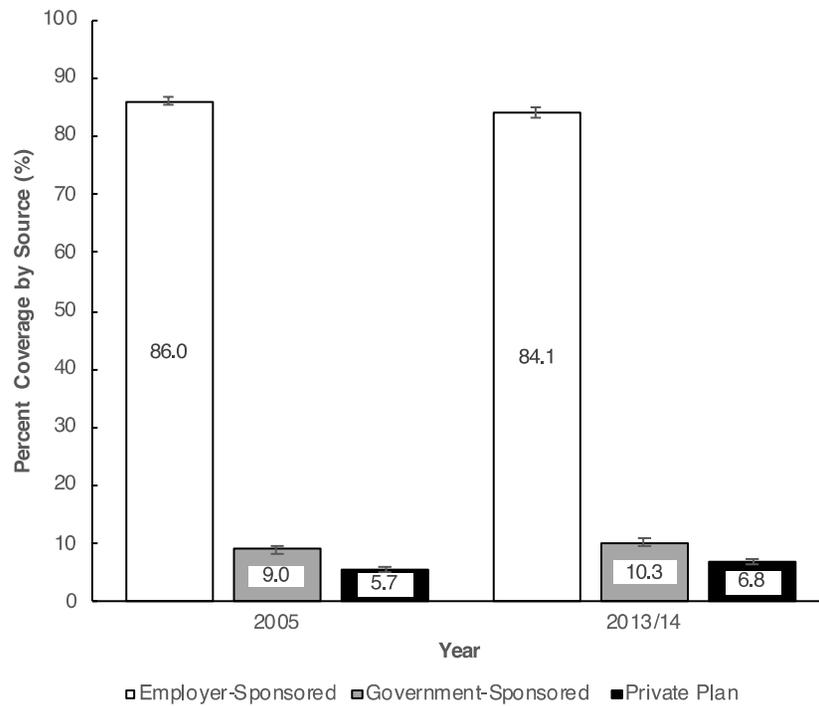
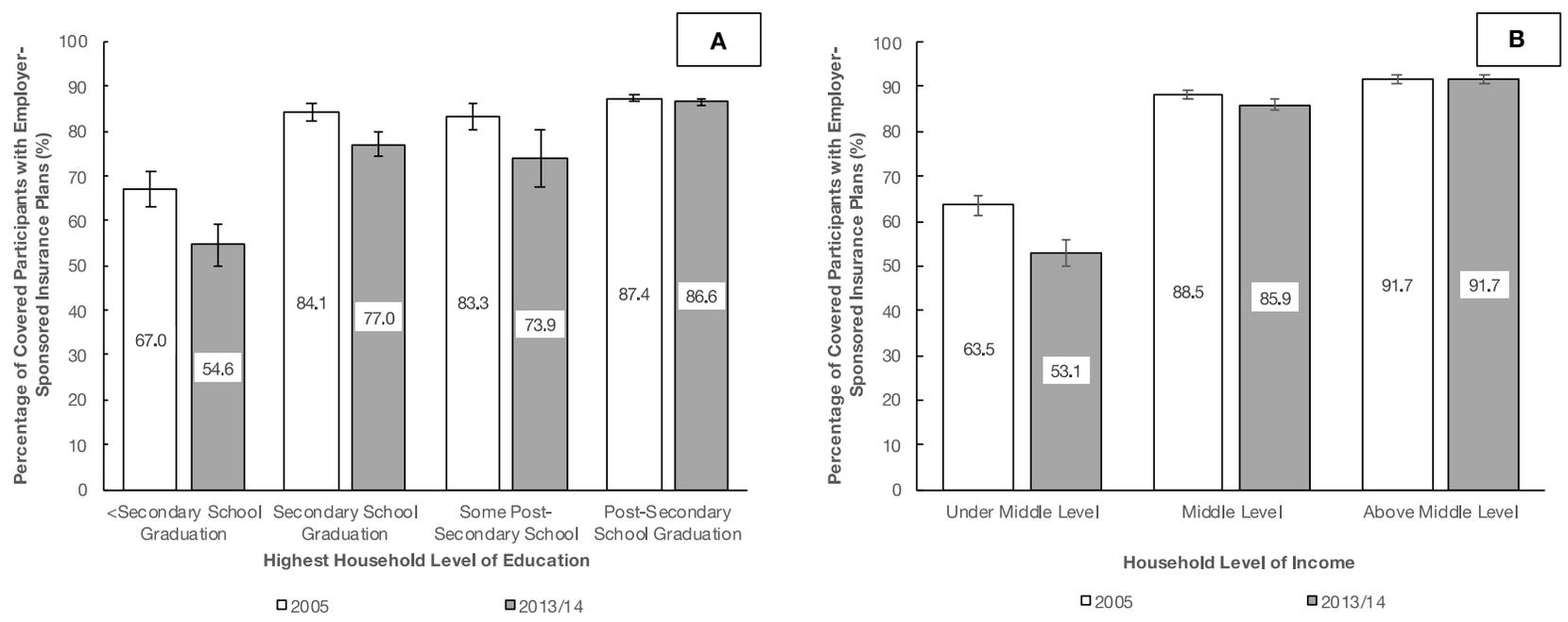
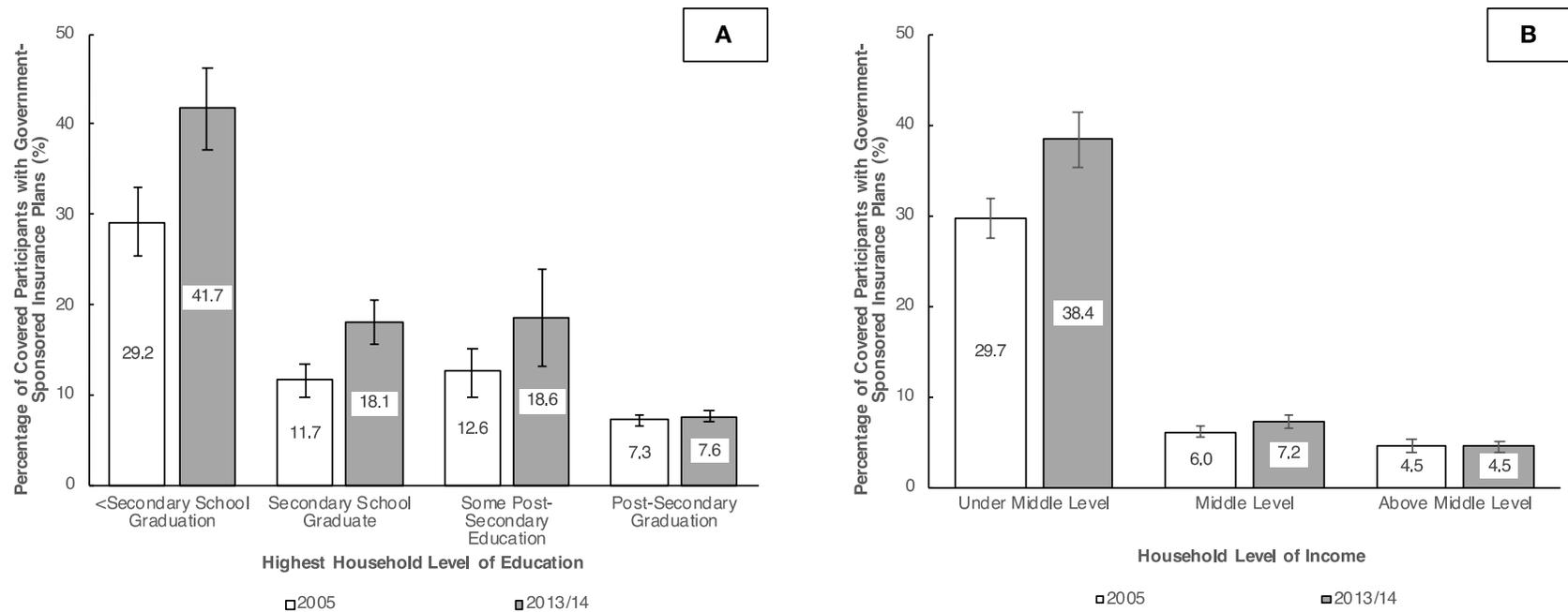


FIGURE 1. Eyeglass insurance coverage by source of funding amongst Ontarians in the 2005 and 2013/14 Canadian Community Health Surveys. Data for 2003 was unavailable. Vertical lines represent the 95% confidence intervals.

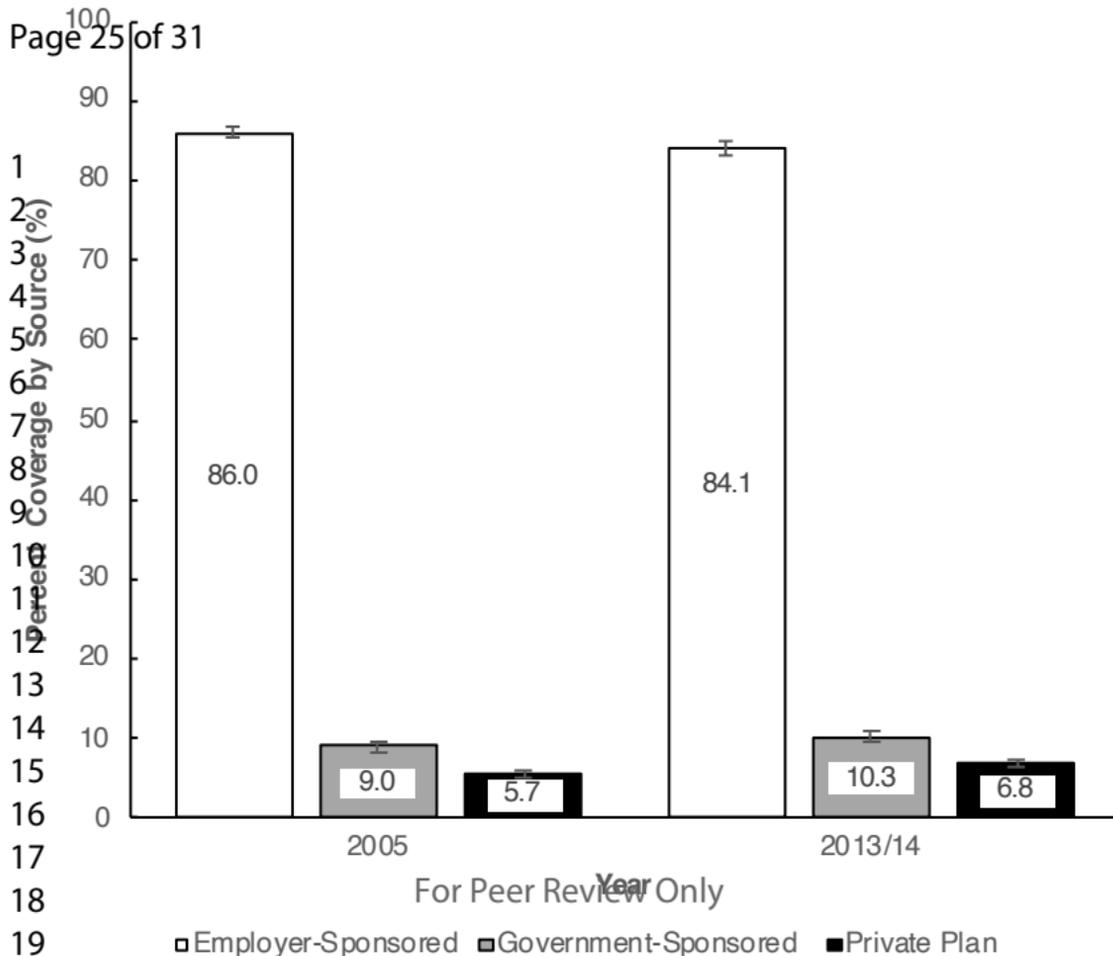
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*FIGURE 2. Percentage of Ontarians having employer-sponsored eyeglass insurance coverage by the highest level of education attained in the household (A) and total household income (B) in the 2005 and 2013/14 Canadian Community Health Surveys. Data for 2003 was unavailable. Vertical lines represent the 95% confidence intervals.*

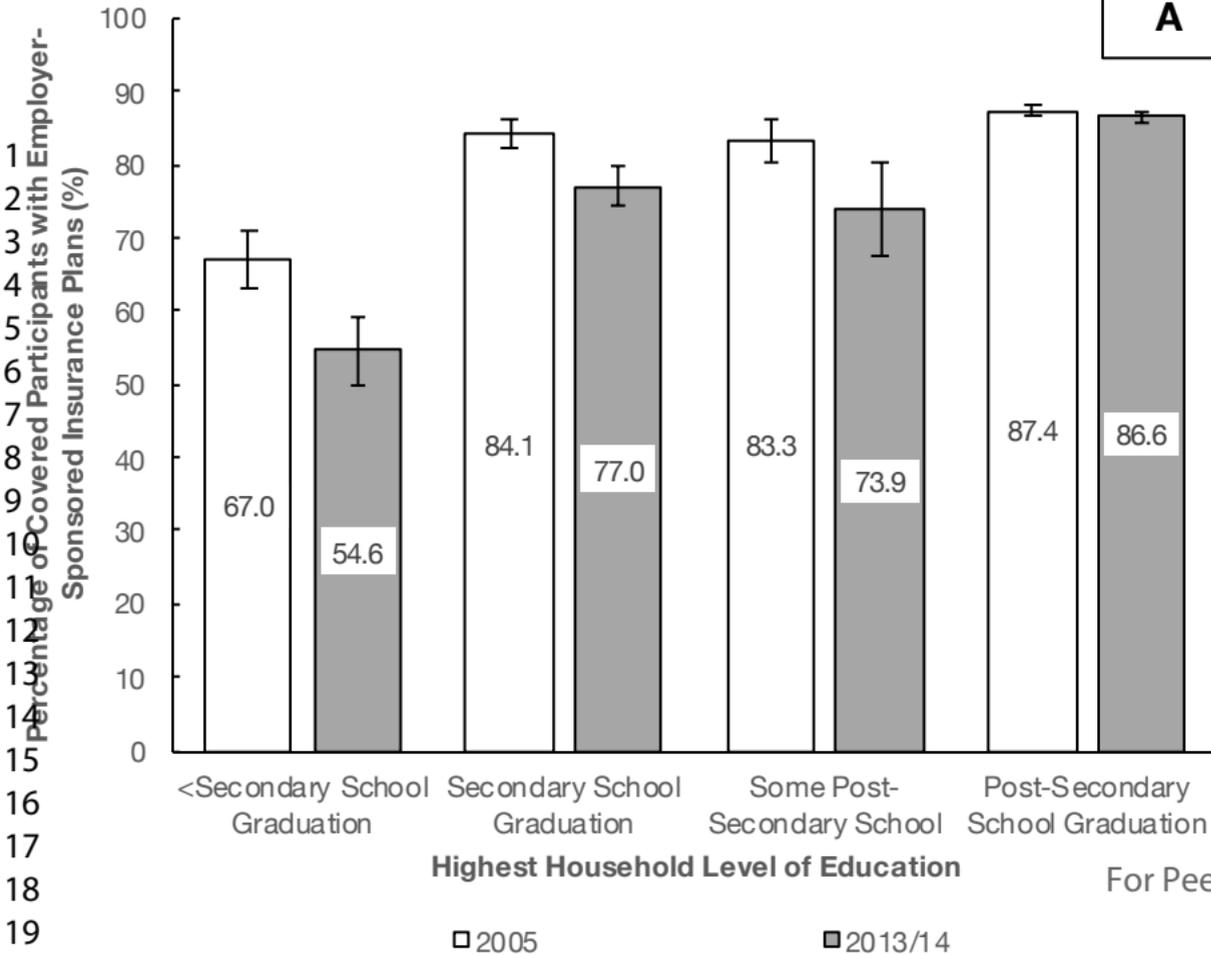


*FIGURE 3. Percentage of Ontarians having government-sponsored eyeglass insurance coverage by the highest level of education attained in the household (A) and total household income (B) in the 2005 and 2013/14 Canadian Community Health Surveys. Data for 2003 was unavailable. Vertical lines represent the 95% confidence intervals.*

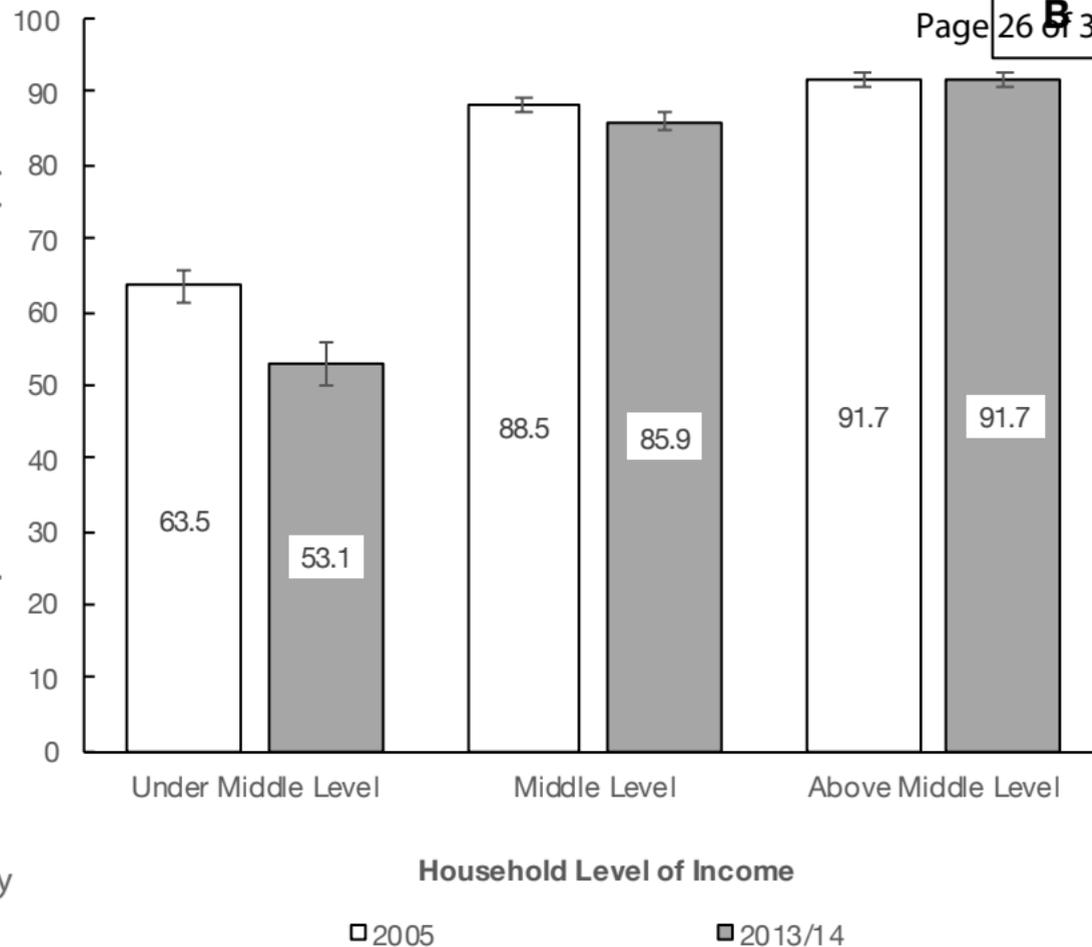


□ Employer-Sponsored    ■ Government-Sponsored    ■ Private Plan

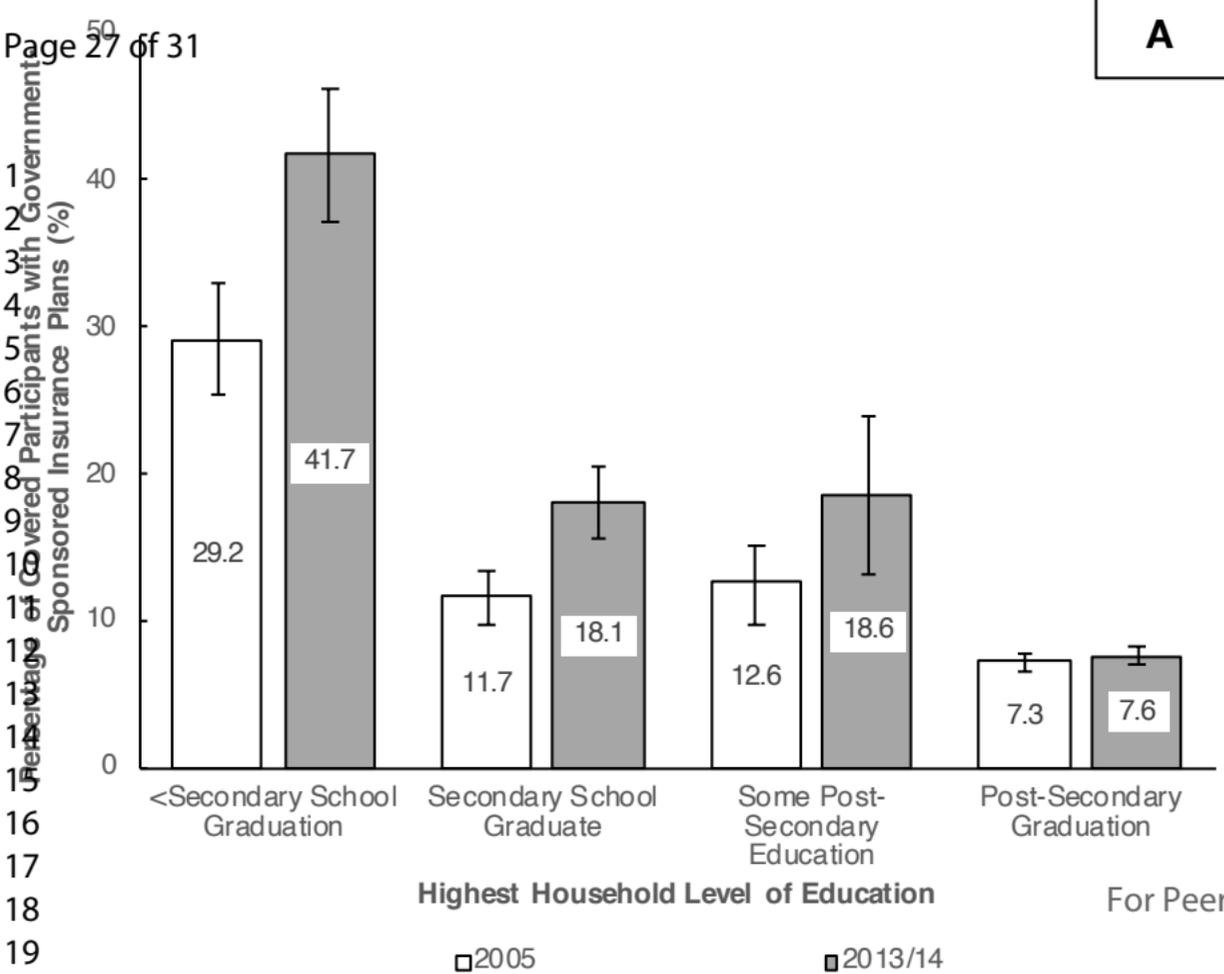
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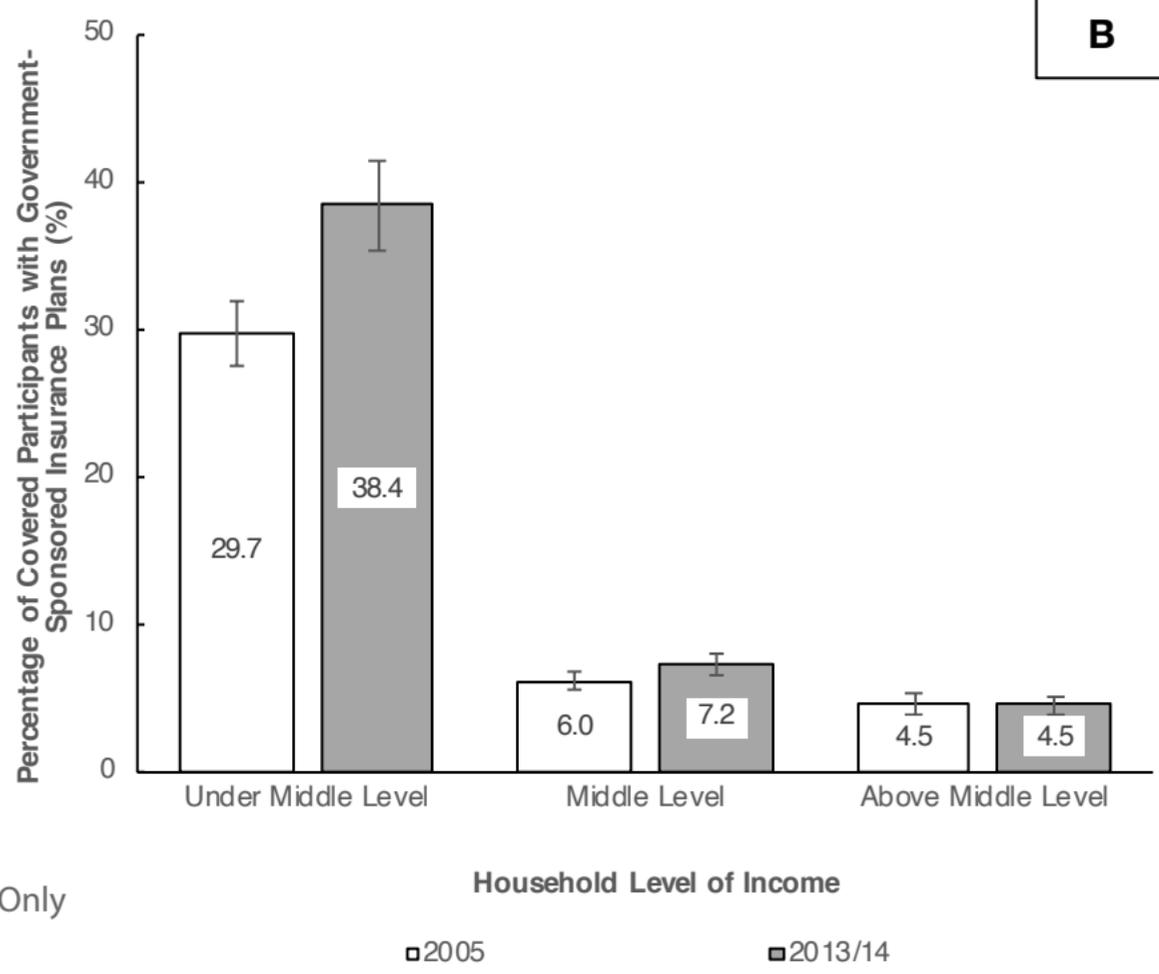
Percentage of Covered Participants with Employer-Sponsored Insurance Plans (%)



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For Peer Review Only

**Table 1: Weighted prevalence of eyeglass insurance coverage stratified by sociodemographic characteristics  
(%, [95% confidence interval])**

Participant Characteristics	2003	2005	2013/2014
<b>Age</b>			
12-19	69.2 [67.3-71.1]	67.6 [65.7-69.6]	67.4 [65.2-69.6]
20-39	62.0 [60.6-63.4]	61.7 [60.4-63.0]	60.5 [58.8-62.1]
40-64	68.7 [67.6-69.9]	68.9 [67.7-70.1]	70.7 [69.2-72.1]
65-74	42.8 [40.8-44.9]	40.9 [38.9-42.9]	44.5 [42.5-46.5]
75+	34.2 [32.1-36.3]	36.2 [33.8-38.6]	34.9 [32.9-36.8]
Total	62.3 [61.5-63.0]	62.1 [61.3-62.8]	62.0 [61.1-62.9]
<b>Sex</b>			
Female	61.7 [60.7-62.8]	60.9 [59.8-61.9]	61.3 [60.0-62.5]
Male	62.8 [61.7-63.9]	63.3 [62.3-64.3]	62.8 [61.4-64.1]
<b>Highest Level of Education in Household</b>			
<secondary school graduation	43.2 [41.0-45.5]	42.5 [40.1-45.0]	37.4 [34.6-40.2]
Secondary school graduation	57.9 [56.0-59.8]	55.9 [53.8-57.9]	53.0 [50.5-55.4]
Some post-secondary school	60.5 [57.4-63.7]	58.9 [55.3-62.5]	57.6 [52.3-62.9]
Post-secondary school graduation	65.7 [64.8-66.6]	65.6 [64.7-66.5]	66.1 [65.1-67.1]
<b>Marital Status</b>			
Married/common-law	66.0 [65.1-66.9]	65.8 [64.8-66.8]	67.2 [66.1-68.3]
Widowed	36.3 [33.9-38.6]	36.3 [33.8-38.8]	36.1 [33.6-38.6]
Separated/divorced	56.9 [54.4-59.5]	57.0 [54.3-59.6]	54.5 [51.1-57.8]
Single/never married	60.2 [58.7-61.7]	59.8 [58.5-61.1]	57.9 [56.2-59.5]
<b>Household Income</b>			
Under middle level	41.6 [40.2-43.0]	38.7 [37.3-40.1]	38.2 [36.4-40.0]
Middle level	65.6 [64.4-66.9]	64.2 [64.2-62.8]	60.8 [59.3-62.2]
Above middle level	77.7 [76.5-78.9]	77.9 [76.8-79.0]	77.3 [76.1-78.5]
<b>Ethnic Background</b>			
White	64.7 [63.9-65.4]	64.4 [63.6-65.1]	64.4 [63.6-65.3]
Non-white	52.2 [50.0-54.4]	53.1 [50.9-55.3]	54.3 [52.0-56.6]
Aboriginal	72.4 [67.1-77.6]	67.6 [53.1-72.0]	71.7 [67.8-75.7]
<b>Immigrant Status</b>			
Non-immigrant	67.1 [66.3-67.8]	66.3 [65.6-67.1]	66.7 [65.8-67.6]
Immigrant			
≤9-years	41.7 [38.1-45.2]	45.4 [41.8-49.0]	43.6 [39.1-48.0]
≥10-years	54.8 [53.0-56.5]	55.3 [53.4-57.3]	55.0 [52.9-57.1]

**Table 2: Adjusted prevalence ratio (PR) of having employer- and government-sponsored insurance in 2013/14 ([95% confidence interval])**

<b>Participant Characteristics</b>	<b>Employer-Sponsored</b>	<b>Government-Sponsored</b>
<b>Age</b>		
12-19 vs. 40-64	1.31 [1.13-1.52]	0.67 [0.63-0.72]
20-39 vs. 40-64	0.95 [0.91-0.99]	0.72 [0.66-0.77]
65-74 vs. 40-64	0.59 [0.57-0.61]	0.85 [0.68-1.05]
75+ vs. 40-64	0.47 [0.39-0.56]	1.02 [0.72-1.45]
<b>Sex</b>		
Male vs. Female	0.98 [0.93-1.03]	1.00 [0.97-1.04]
<b>Highest Level of Education in Household</b>		
<secondary school graduation vs. secondary school graduation	0.79 [0.75-0.84]	1.27 [1.06-1.53]
Some post-secondary school vs. secondary school graduation	1.05 [0.95-1.16]	1.23 [0.96-1.57]
Post-secondary school graduation vs. secondary school graduation	1.12 [1.08-1.16]	0.84 [0.67-1.05]
<b>Marital Status</b>		
Widowed vs. Married/common-law	0.88 [0.72-1.07]	0.82 [0.77-0.87]
Separated/divorced vs. Married/common-law	0.86 [0.76-0.97]	1.21 [1.10-1.32]
Single/never married vs. Married/common-law	0.70 [0.60-0.81]	1.60 [1.30-1.96]
<b>Household Income</b>		
Under middle level vs. above middle level	0.37 [0.35-0.40]	3.64 [3.37-3.93]
Middle level vs. above middle level	0.82 [0.78-0.85]	1.25 [1.06-1.47]
<b>Ethnic Background</b>		
Non-white vs. White	0.95 [0.87-1.04]	0.78 [0.58-1.06]
Aboriginal vs. White	0.91 [0.83-0.99]	3.26 [2.81-3.79]
<b>Immigrant Status</b>		
Immigrant vs. non-immigrant	0.87 [0.86-0.89]	0.69 [0.64-0.74]

# Reporting checklist for cross sectional study.

Based on the STROBE cross sectional guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the STROBE cross sectional reporting guidelines, and cite them as:

von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies.

		Reporting Item	Page Number
<b>Title and abstract</b>			
Title	<a href="#">#1a</a>	Indicate the study's design with a commonly used term in the title or the abstract	1
Abstract	<a href="#">#1b</a>	Provide in the abstract an informative and balanced summary of what was done and what was found	3-4
<b>Introduction</b>			
Background / rationale	<a href="#">#2</a>	Explain the scientific background and rationale for the investigation being reported	5
Objectives	<a href="#">#3</a>	State specific objectives, including any prespecified hypotheses	5
<b>Methods</b>			
Study design	<a href="#">#4</a>	Present key elements of study design early in the paper	6
Setting	<a href="#">#5</a>	Describe the setting, locations, and relevant dates, including periods of	6

1		recruitment, exposure, follow-up, and data collection	
2	Eligibility criteria	<a href="#">#6a</a> Give the eligibility criteria, and the sources and methods of selection of	6
3		participants.	
4			
5			
6		<a href="#">#7</a> Clearly define all outcomes, exposures, predictors, potential	6-7
7		confounders, and effect modifiers. Give diagnostic criteria, if applicable	
8			
9			
10	Data sources /	<a href="#">#8</a> For each variable of interest give sources of data and details of methods	7
11	measurement	of assessment (measurement). Describe comparability of assessment	
12		methods if there is more than one group. Give information separately	
13		for for exposed and unexposed groups if applicable.	
14			
15			
16			
17	Bias	<a href="#">#9</a> Describe any efforts to address potential sources of bias	7, 12
18			
19	Study size	<a href="#">#10</a> Explain how the study size was arrived at	6
20			
21	Quantitative	<a href="#">#11</a> Explain how quantitative variables were handled in the analyses. If	7
22	variables	applicable, describe which groupings were chosen, and why	
23			
24			
25	Statistical	<a href="#">#12a</a> Describe all statistical methods, including those used to control for	8
26	methods	confounding	
27			
28			
29	Statistical	<a href="#">#12b</a> Describe any methods used to examine subgroups and interactions	7-8
30	methods		
31			
32			
33	Statistical	<a href="#">#12c</a> Explain how missing data were addressed	7
34	methods		
35			
36			
37	Statistical	<a href="#">#12d</a> If applicable, describe analytical methods taking account of sampling	8
38	methods	strategy	
39			
40			
41	Statistical	<a href="#">#12e</a> Describe any sensitivity analyses	N/A
42	methods		
43			
44	<b>Results</b>		
45			
46	Participants	<a href="#">#13a</a> Report numbers of individuals at each stage of study—eg numbers	9
47		potentially eligible, examined for eligibility, confirmed eligible,	
48		included in the study, completing follow-up, and analysed. Give	
49		information separately for for exposed and unexposed groups if	
50		applicable.	
51			
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55	Participants	<a href="#">#13b</a> Give reasons for non-participation at each stage	7
56			
57	Participants	<a href="#">#13c</a> Consider use of a flow diagram	6-7
58			
59			
60			

1	Descriptive data	<a href="#">#14a</a>	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	19-20
2				
3				
4				
5				
6	Descriptive data	<a href="#">#14b</a>	Indicate number of participants with missing data for each variable of interest	7
7				
8				
9				
10	Outcome data	<a href="#">#15</a>	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	8-10,19-20
11				
12				
13				
14	Main results	<a href="#">#16a</a>	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
15				
16				
17				
18				
19	Main results	<a href="#">#16b</a>	Report category boundaries when continuous variables were categorized	19-20
20				
21	Main results	<a href="#">#16c</a>	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
22				
23				
24				
25	Other analyses	<a href="#">#17</a>	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	8-10
26				
27				
28				
29	<b>Discussion</b>			
30				
31	Key results	<a href="#">#18</a>	Summarise key results with reference to study objectives	10-11
32				
33				
34	Limitations	<a href="#">#19</a>	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	12
35				
36				
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38				
39	Interpretation	<a href="#">#20</a>	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	10-12
40				
41				
42				
43				
44	Generalisability	<a href="#">#21</a>	Discuss the generalisability (external validity) of the study results	10-11
45				
46				
47	<b>Other</b>			
48	<b>Information</b>			
49				
50				
51	Funding	<a href="#">#22</a>	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1
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55				

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